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Malaria

THE STORY OF AN INDIVIDUAL PROBLEM AND A COMMUNITY PROBLEM

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MALARIA

The Story of an Individual Problem and a Community Problem

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TO THOSE WHO WISH TO USE THIS BOOK:

In certain sections of our country malaria presents a serious economic and social problem. Its costs, in addition to individual suffering, amount to millions of dollars annually in the form of untilled acres of land, loss of time, and diminished earning power. Malaria strikes hardest during the crop season when labor is needed most and lessens in its victims both the capacity and the inclination for work.

Children as well as adults suffer. Children with malaria cannot grow as they should.

Today we know that much can be accomplished toward controlling the disease. The purpose of this book is to present as simply as possible some basic facts about malaria, its cause, method of spread, and control, in order that persons reading the story will be stimulated to provide that united support and community action which alone can control this insidious disease.

E. G. P.

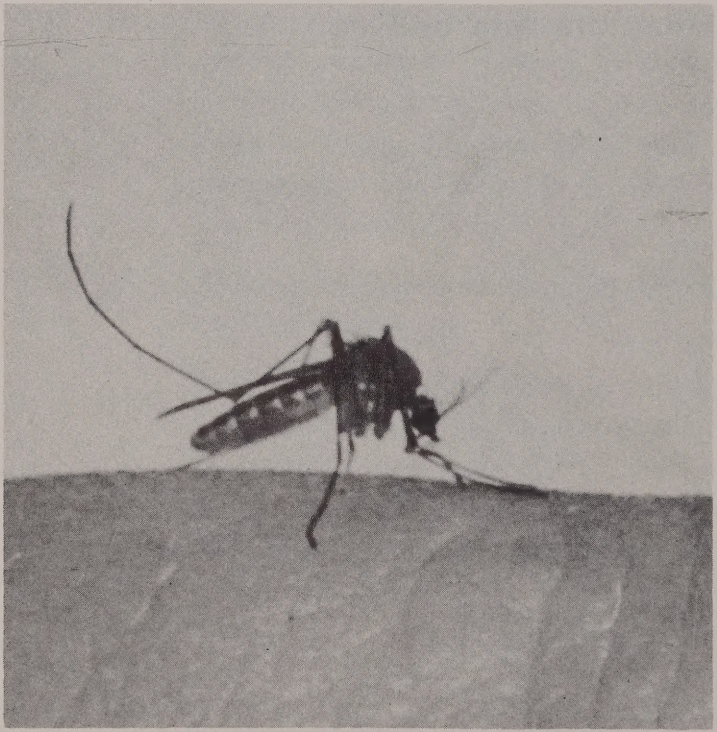
WHAT IS MALARIA?

MALARIA is a disease. It makes people weak and sick. They do not feel like working. They do not feel like playing. They are thin and pale.

WHAT SPREADS MALARIA?

A kind of mosquito called ***A-noph'-e-les quad-ri-mac-u-látus*** spreads malaria. Many people call this mosquito "quad." Only the female "quad" spreads malaria because she is the only one that bites. When she bites, she "stands on her head." That is one way to tell that she is a "quad" mosquito.

There are many kinds of mosquitoes which do not spread malaria.

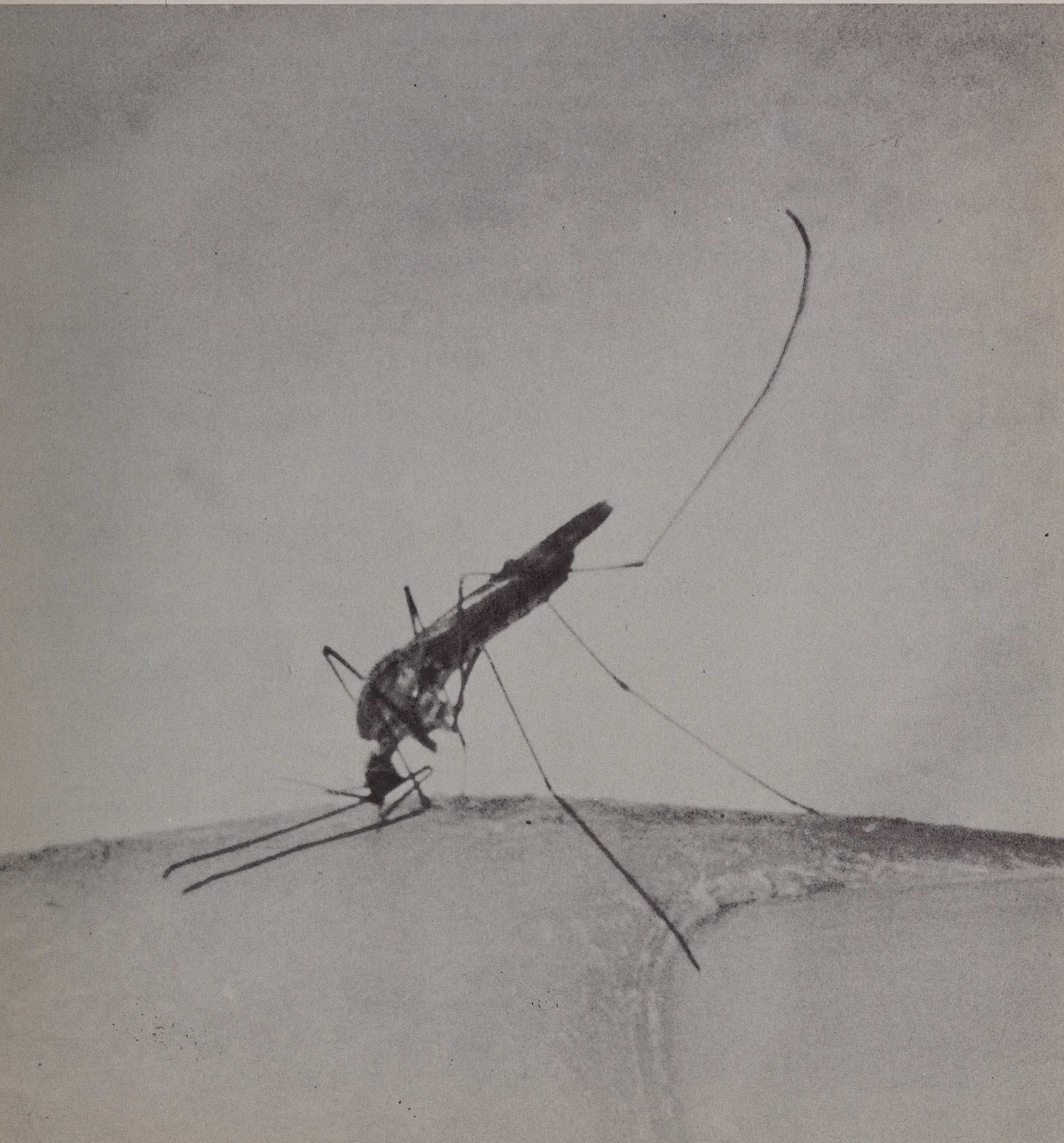


This mosquito does not spread malaria. It is a common pest mosquito.

(7 times normal size,)

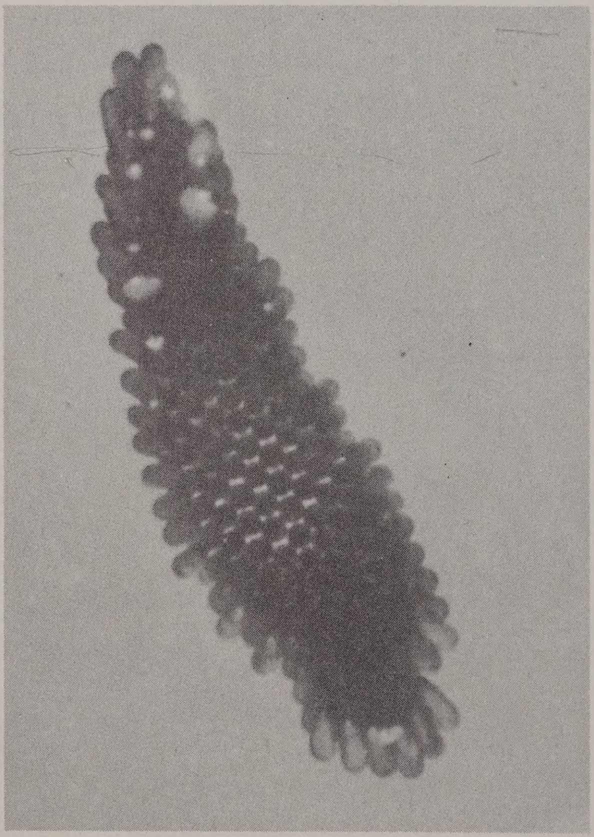
This mosquito does spread malaria. It is a female "quad."

(14 times normal size.)



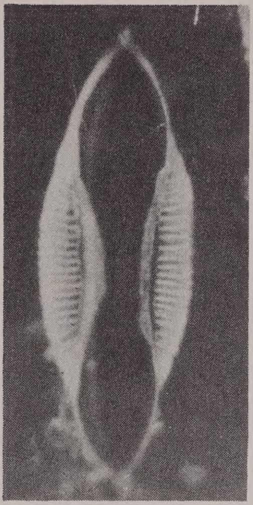
HOW DO MALARIA MOSQUITOES LIVE?

The female mosquitoes lay their eggs on water. The water must be warm (70° F.) before the eggs will hatch. These eggs are very small. They float on the water as seen in the picture on the next page.



The eggs of a common mosquito are stuck together. They form a small raft.

These are not malaria mosquito eggs. They are common pest mosquito eggs.

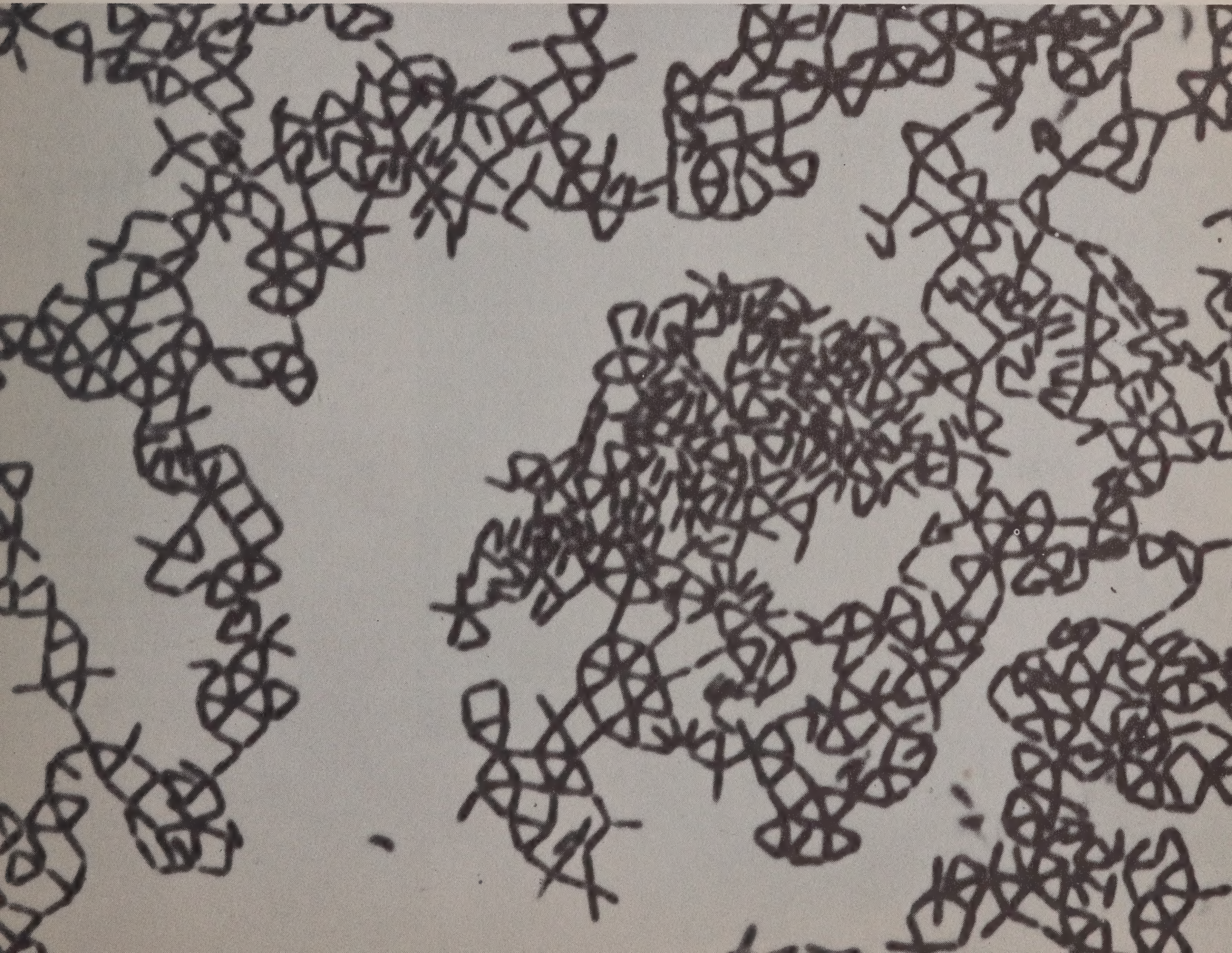


One malaria mosquito egg.

(100 times normal size.)

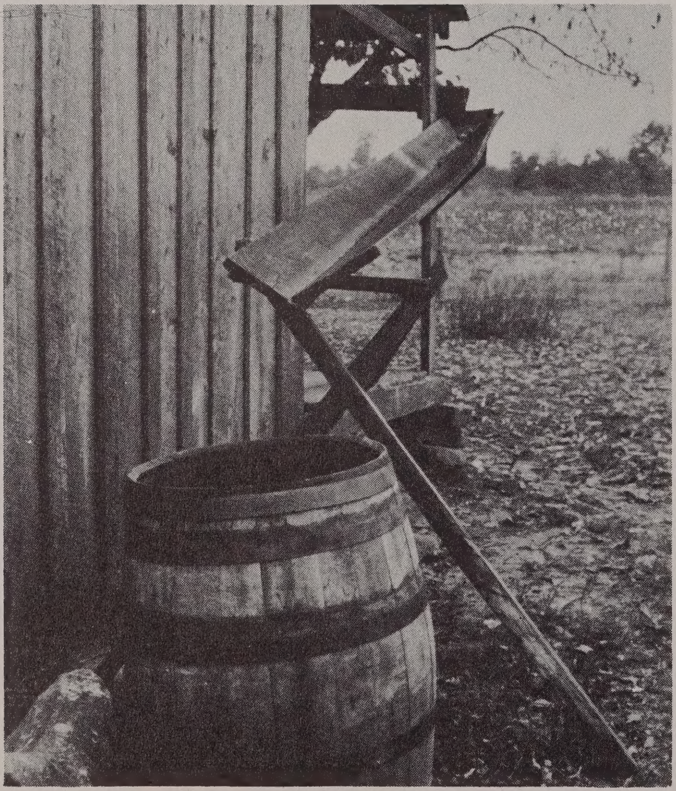
These are malaria mosquito eggs. They have floated together and have formed patterns.

(10 times normal size.)



The eggs of the malaria mosquito are found in clear, warm, quiet pools or ponds. Sometimes they are found near the banks of quiet lakes. These pools or ponds usually have water plants growing in them.

MALARIA MOSQUITO EGGS WILL BE FOUND

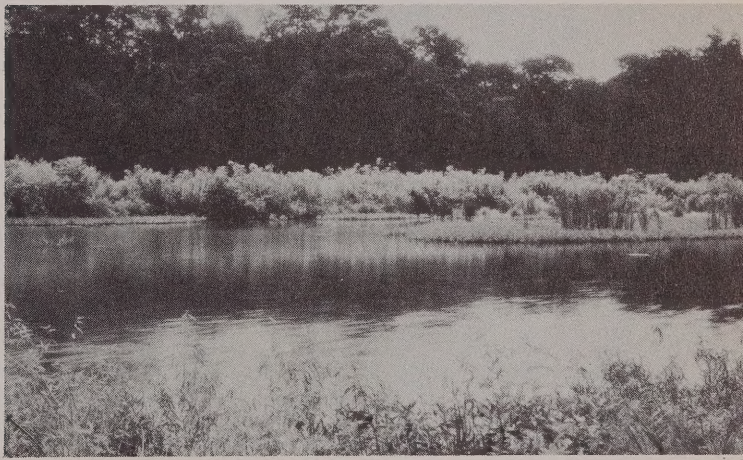


NOT HERE

BUT HERE

in sink holes where water has collected,

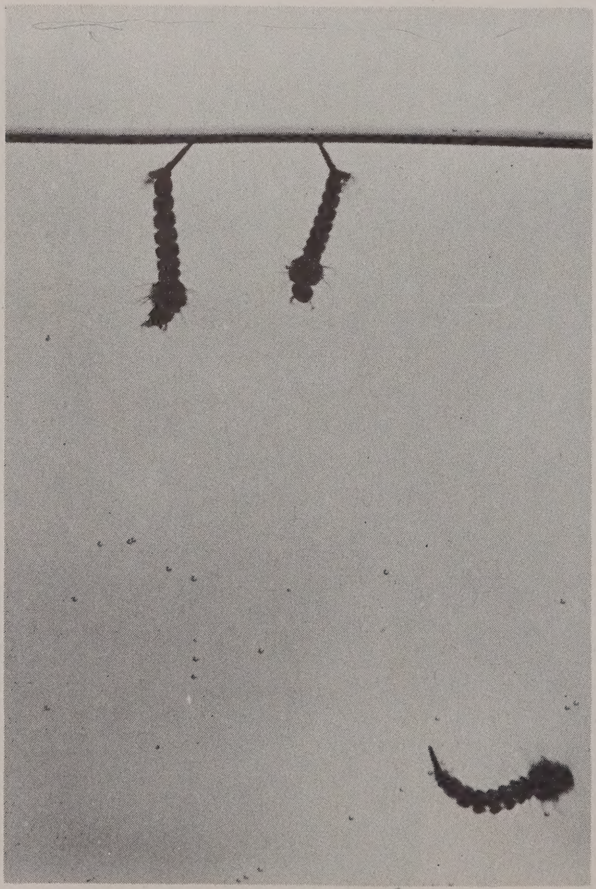
in pools choked with brush,



in creeks with many water plants,

and in swamps.

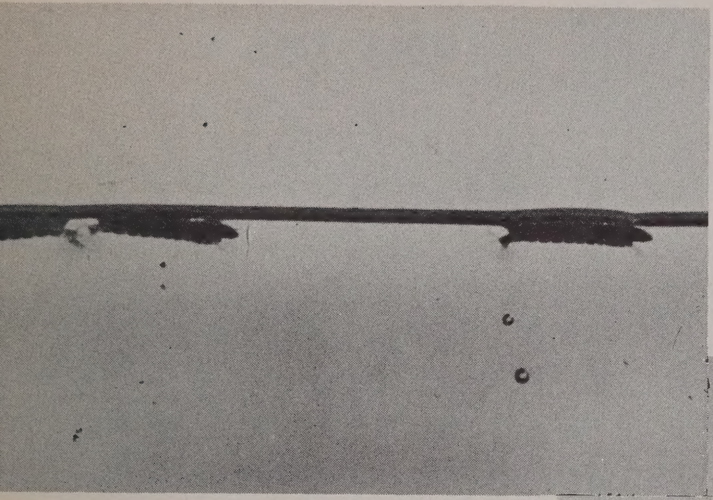
The larvae or "wiggle-tails" of the malaria mosquitoes hatch from the eggs. These malaria mosquito larvae lie flat just below the surface of the water. They feed at the surface of the water.



These are not malaria mosquito larvae.

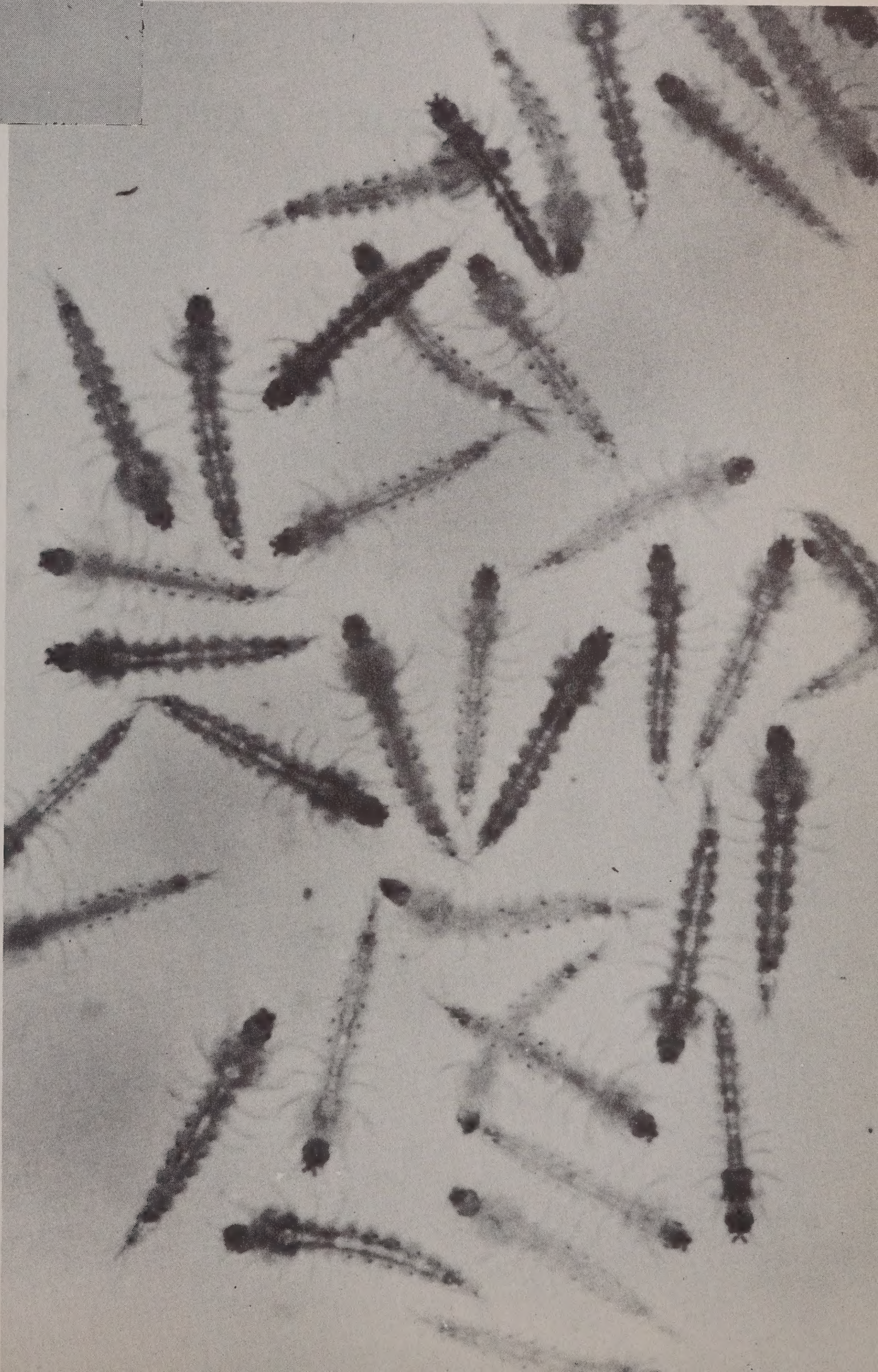
These are larvae of the common pest mosquito.

(3 times normal size.)



The larvae lie flat just below the surface of the water.

(3 times normal size.)



These are malaria mosquito larvae.

(3 times normal size.)

The larvae or "wiggle-tails" of the malaria mosquitoes are found in clear, warm, quiet pools or ponds of water. These pools or ponds usually have water plants growing in them. Larvae stay at the surface for air and for food.

MALARIA MOSQUITO LARVAE WILL BE FOUND

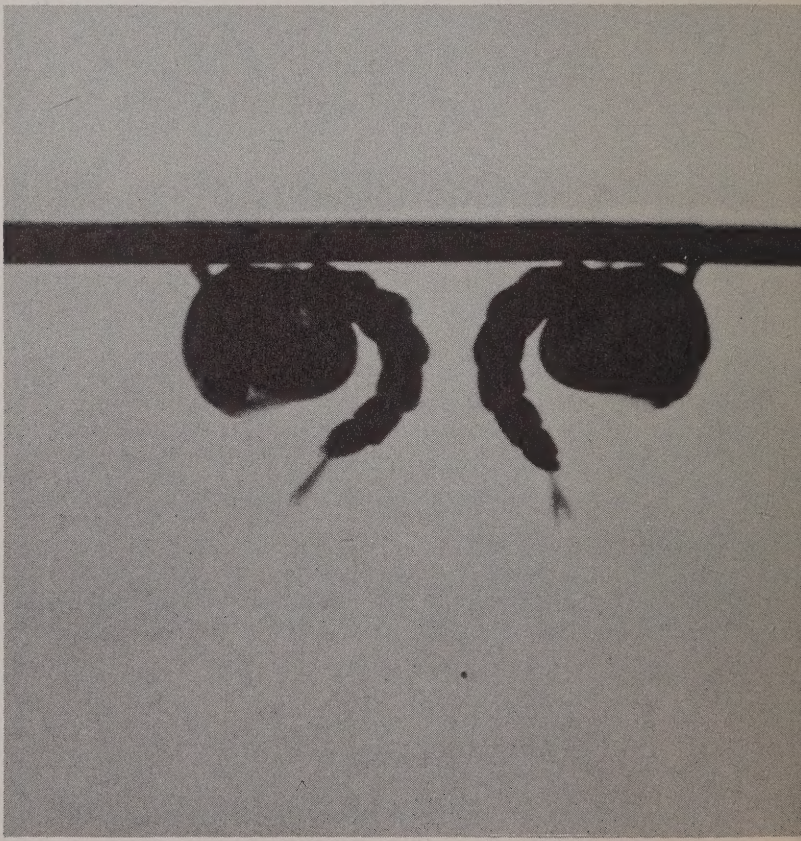
NOT HERE

BUT HERE

AND HERE

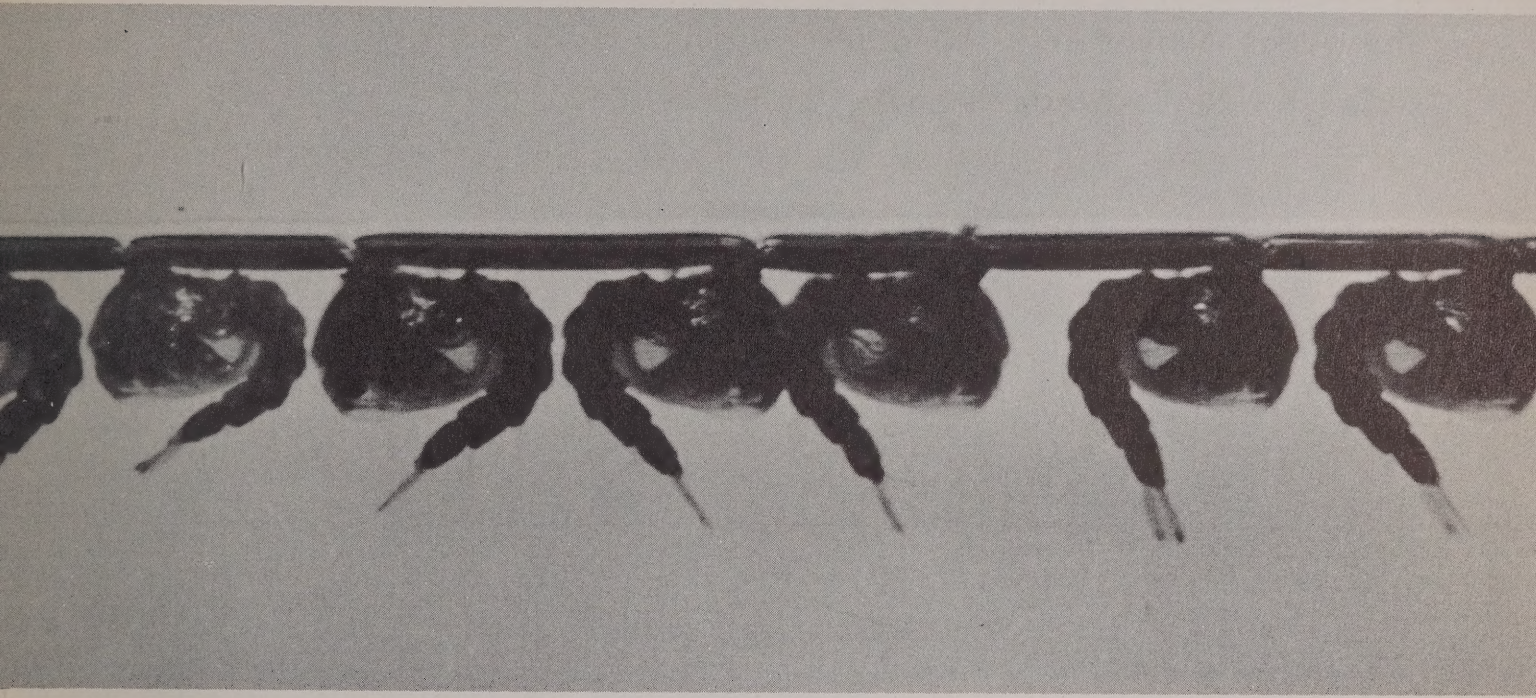
The larvae of the malaria mosquitoes change into the pupae or "tumblers." These pupae or "tumblers" may be seen bobbing around in the water.

These are not malaria mosquito pupae.



These are pupae of common pest mosquitoes. The dark line above them is the water surface.

(10 times normal size.)

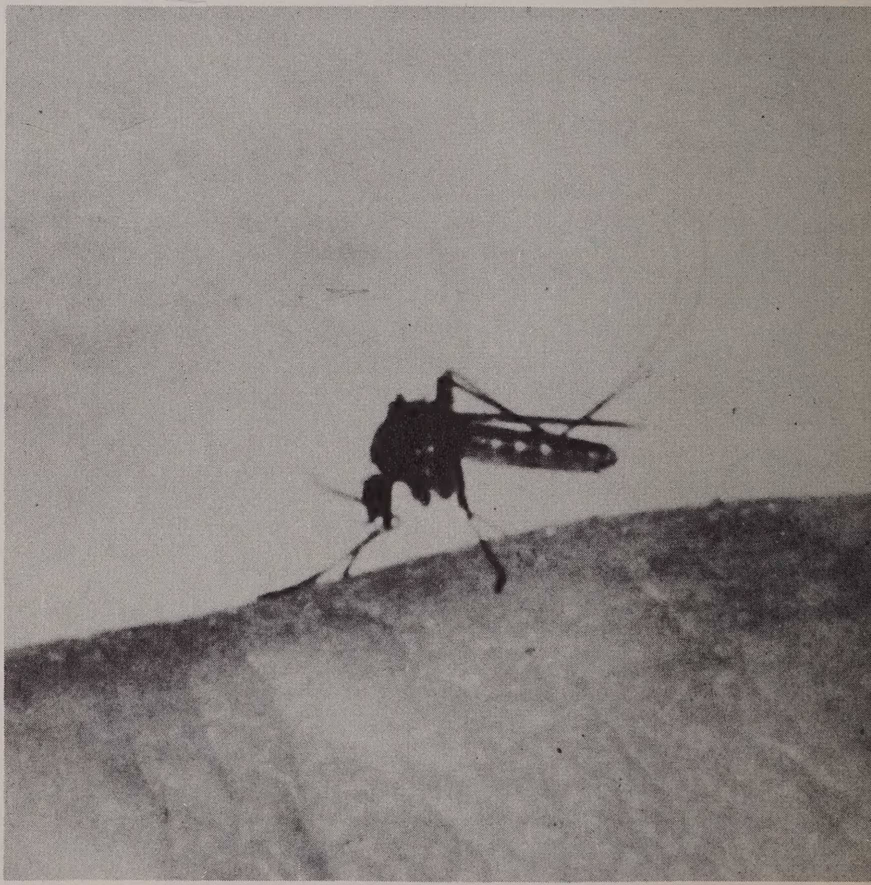


These are malaria mosquito pupae. The dark line above the pupae is the water surface. The breaks in the water surface are made by the breathing tubes of the pupae.

(10 times normal size.)

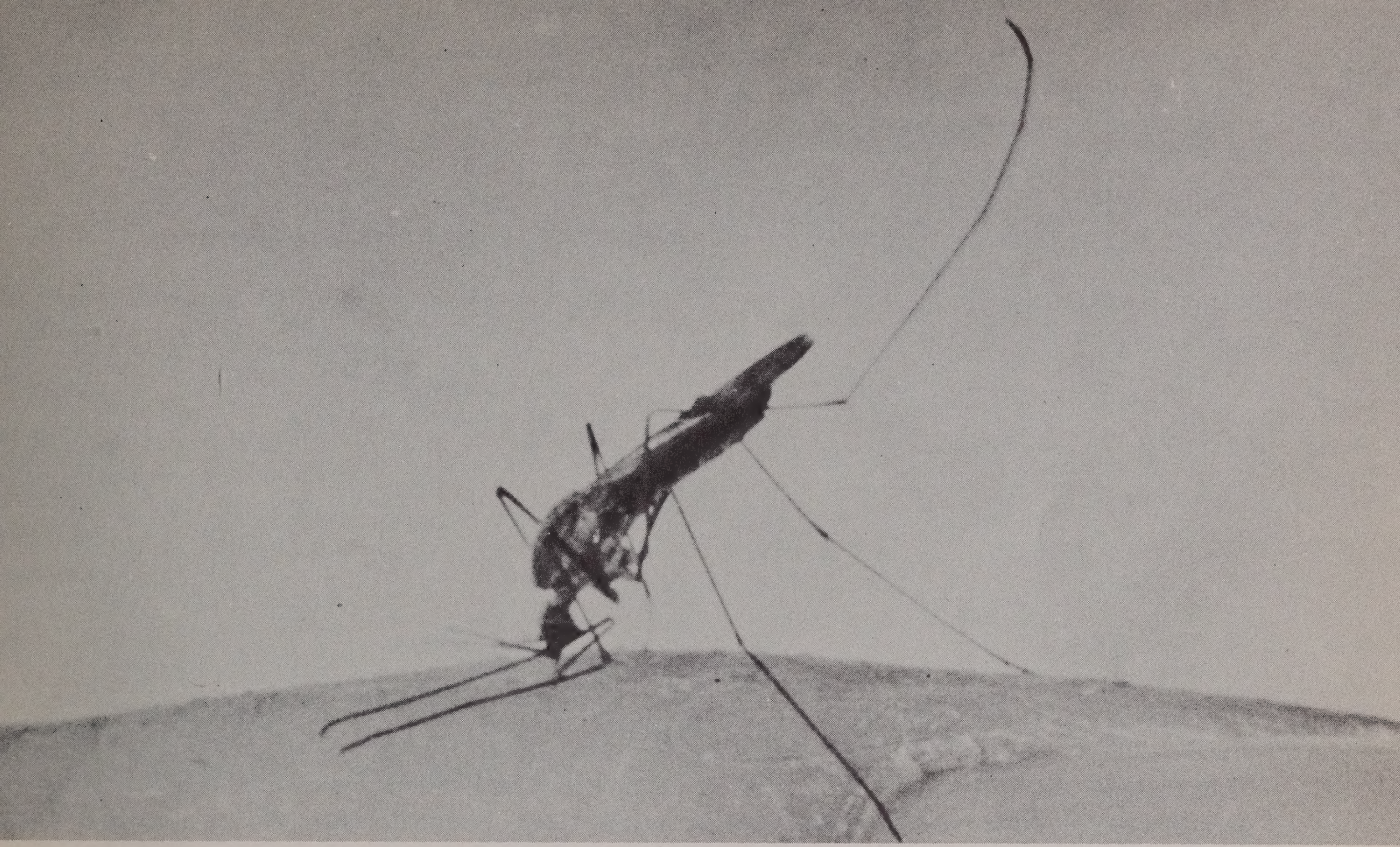
The pupae change into the adult mosquitoes. The adult mosquito bites and rests "standing on her head."

This is not a malaria mosquito.



This is a common pest mosquito in the biting position. She does not "stand on her head."

(10 times normal size.)



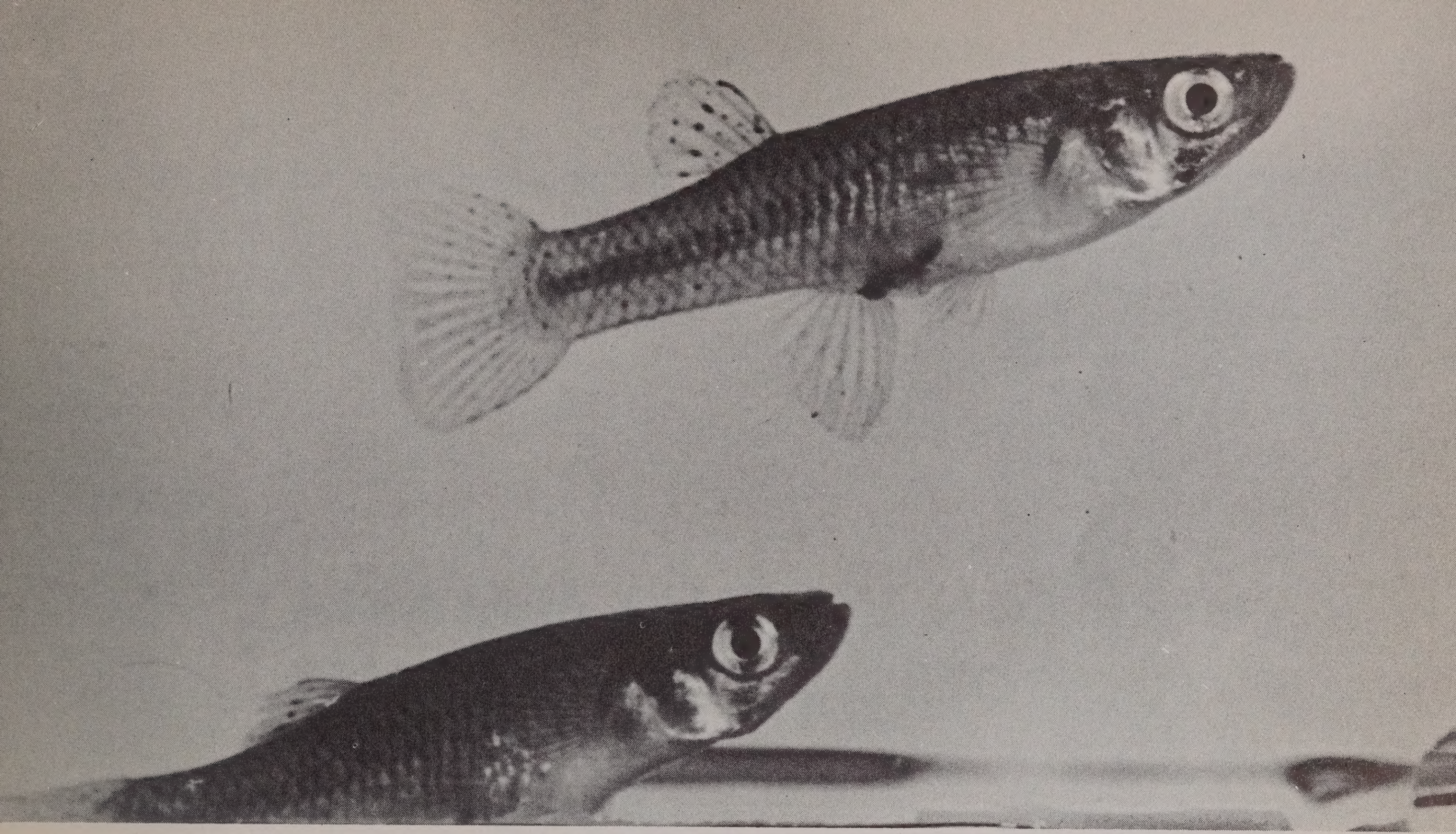
This is an adult "quad" in the biting position. She is "standing on her head."

(10 times normal size.)

DO MOSQUITOES HAVE ENEMIES?

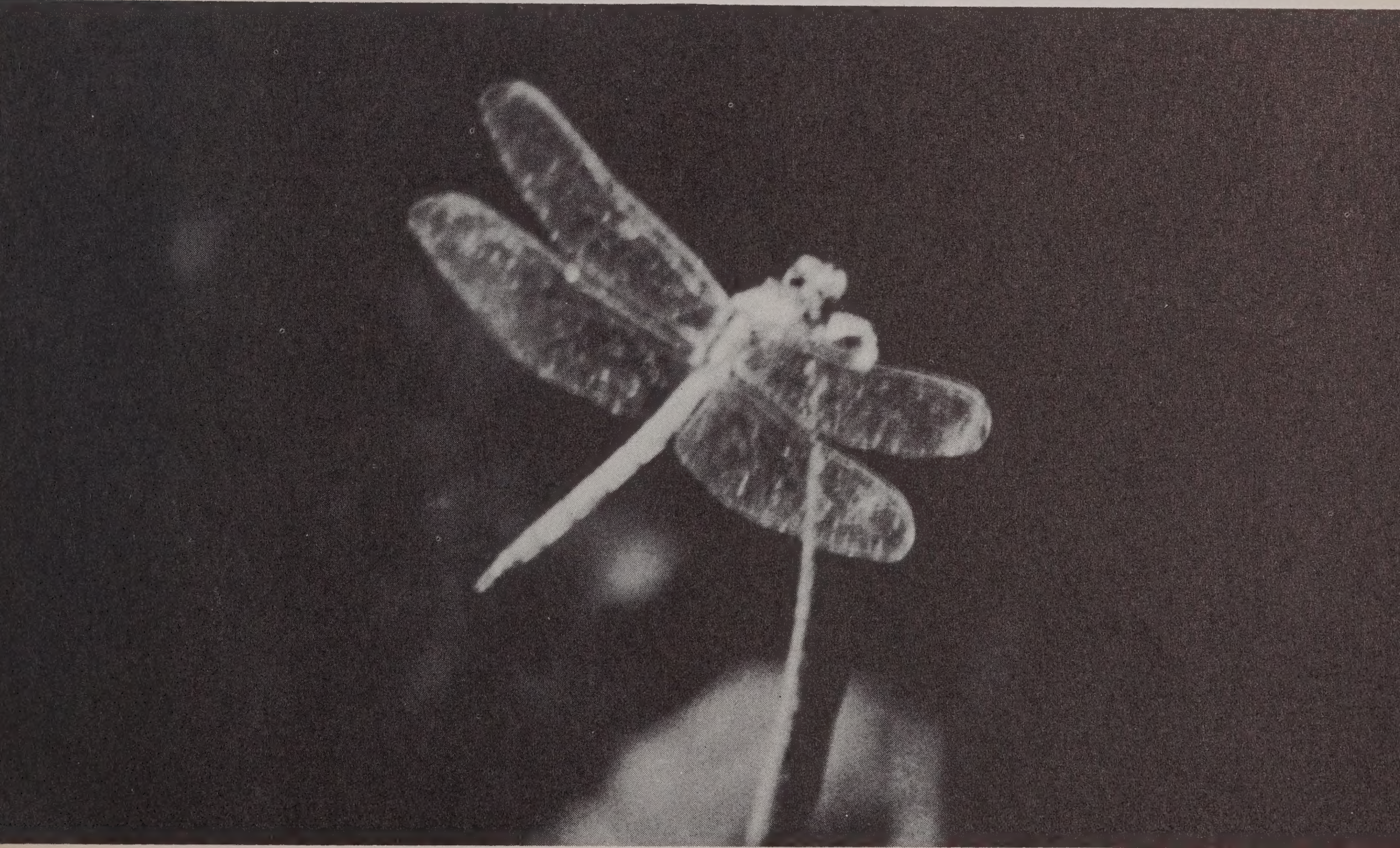
Often mosquitoes do not live to become adults. They have enemies in the water which eat them while they are wiggle-tails and tumblers. One enemy is the top minnow.

They also have enemies which eat them after they become adults. These enemies are in the air. One enemy is the dragonfly.



The top minnow, an enemy of mosquito larvae and pupae in the water.

(2½ times normal size.)



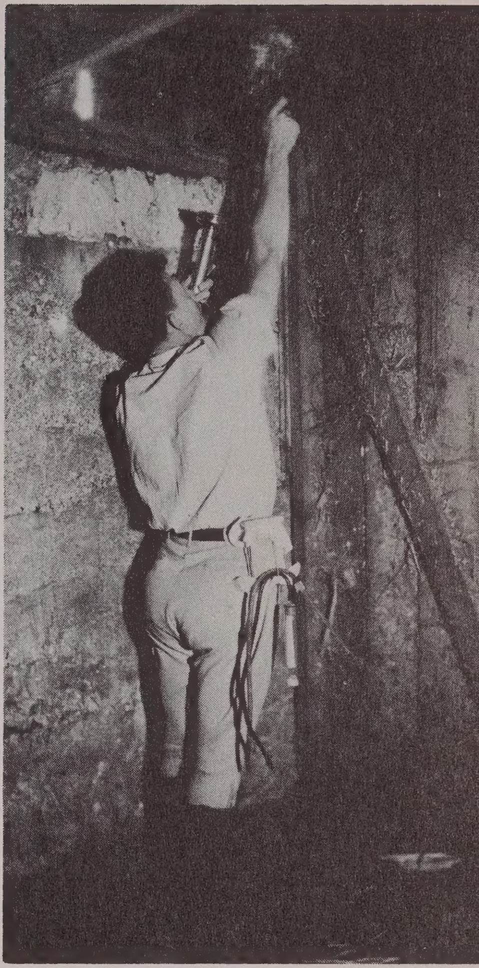
The dragonfly, an enemy of mosquito adults in the air.

(Normal size.)

WHERE CAN WE FIND MALARIA MOSQUITOES IN THE DAYTIME?

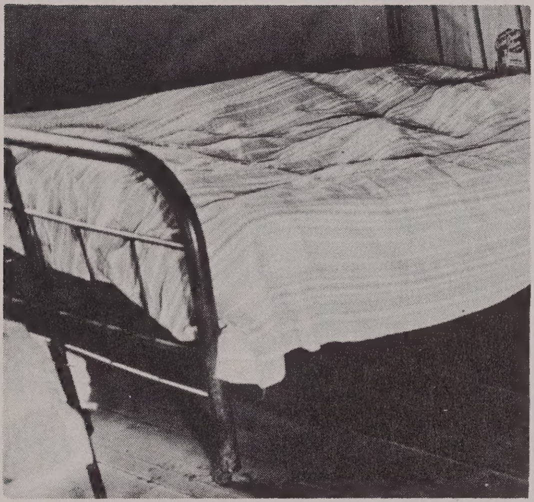
During the day we may find malaria mosquitoes in cool, dark, damp places. They like hollow stumps, barns, and stables in which there are farm animals. Sometimes we find them behind beds and in other dark places in houses.

We look for malaria mosquitoes



in barns,

behind beds,



in hollow stumps,

and in stables with farm animals.

WHEN DO MALARIA MOSQUITOES BITE?

"Quad" mosquitoes bite at twilight and at night. If we stay in places that are mosquito-proofed, the mosquitoes are less likely to get in and bite us. There will be less chance of having malaria.

"QUAD" MOSQUITOES BITE

NOT NOW

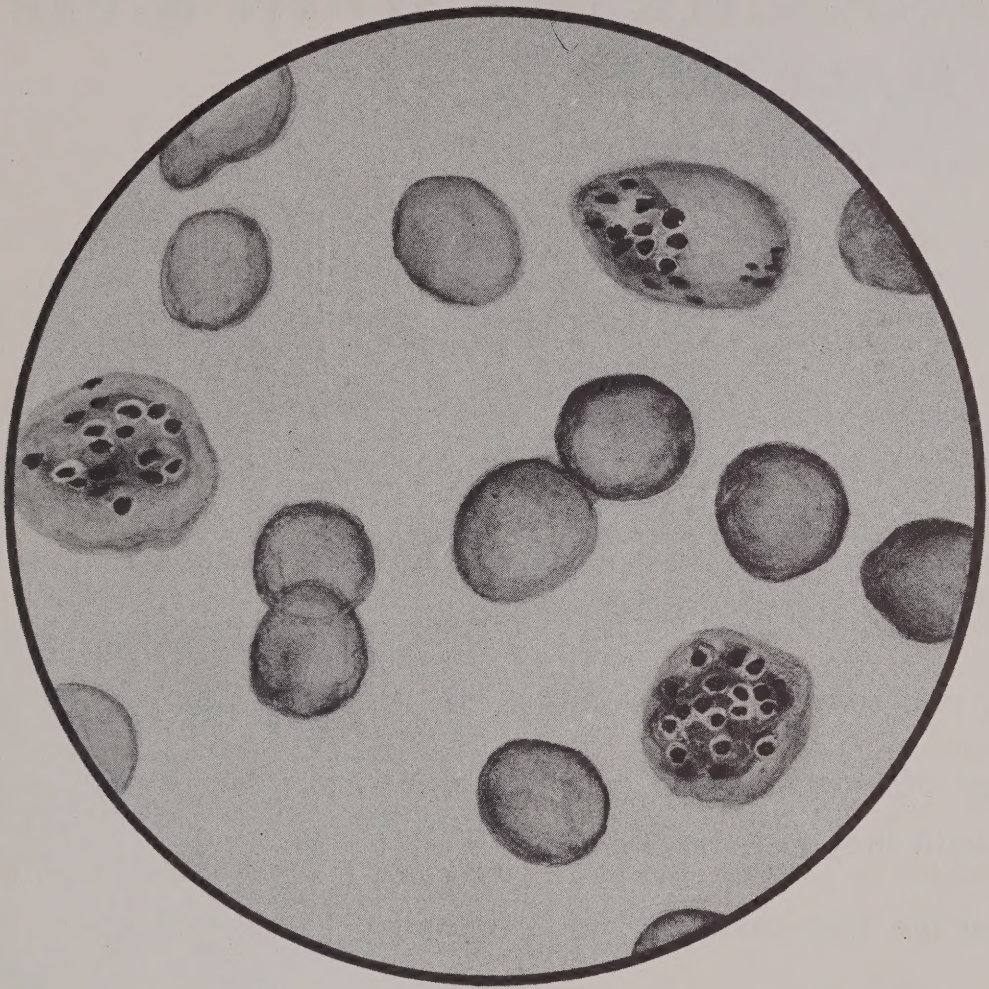
BUT NOW

WHAT CAUSES MALARIA?

Malaria is caused by germs called malaria parasites. When the female mosquito bites a person with malaria, she sucks up parasites with the blood. If she bites another person twelve days later, she puts parasites into that person's blood. This is how the female "quad" spreads malaria.

These malaria parasites are found in the red cells of the blood. The parasites are very tiny. They cannot be seen except through a powerful microscope. The microscope makes the parasites look large enough for us to see.

If you should look through a microscope at a drop of blood from a person with malaria, you would see what is in the picture on the next page.



HOW CAN WE TELL WHEN A PERSON HAS MALARIA?

A drop of a person's blood is examined to find out whether or not that person has malaria.

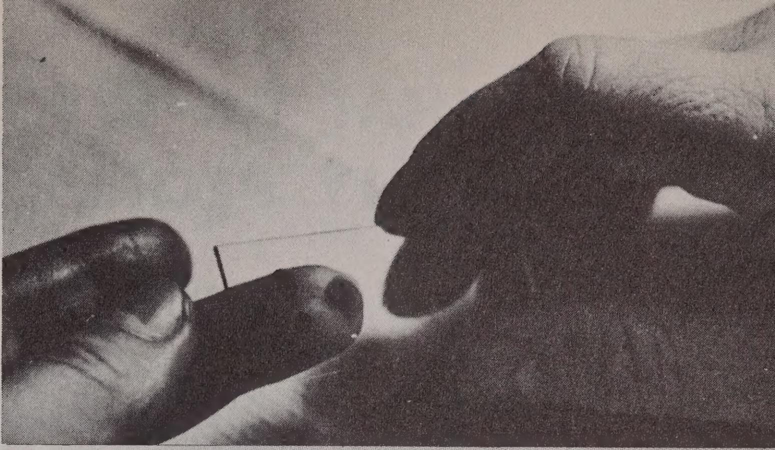
A doctor pricks the person's finger to get the blood.

The drops of blood are put on a piece of clean glass and are spread around until they are very thin.

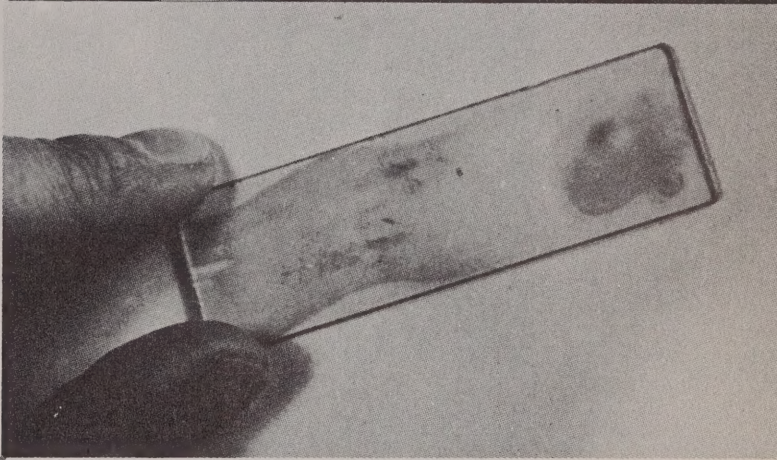
The drops are then studied through a powerful microscope.

If germs or parasites are found in the blood, the person has malaria.

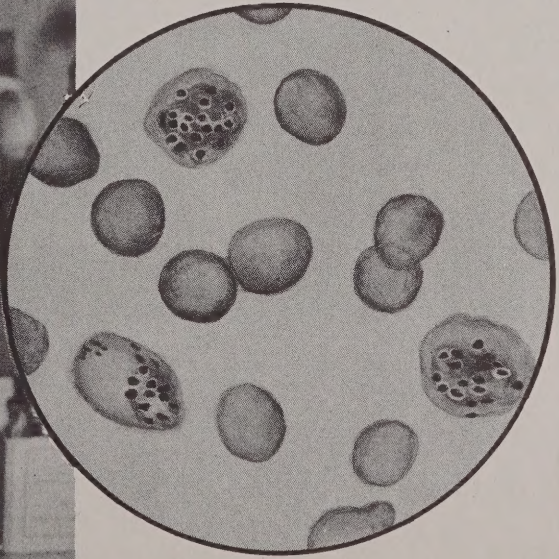
Drops of blood



Spread around



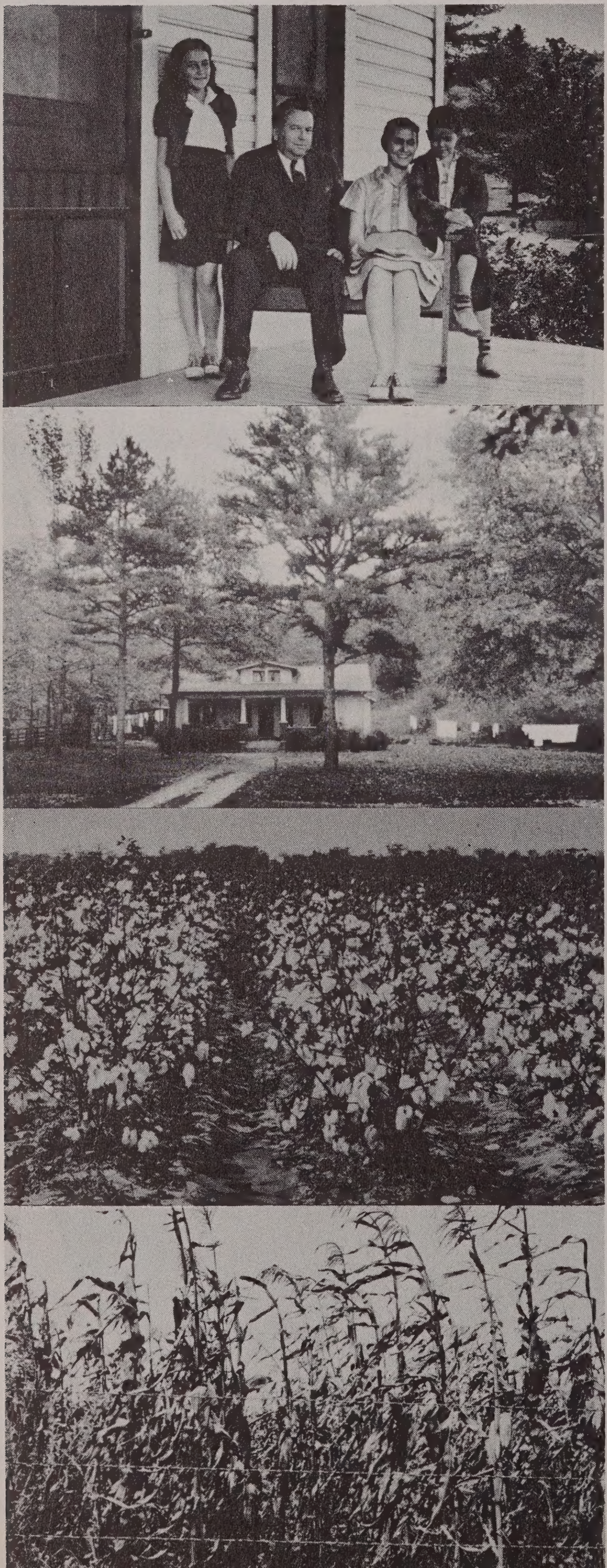
Studied



Parasites in the blood are seen through the microscope.

WHAT DO WE FIND IN PLACES WHERE MANY PEOPLE HAVE MALARIA?

NOT THIS



BUT THIS

WE CAN KEEP MALARIA MOSQUITOES AND MALARIA OR WE CAN CONTROL THEM.

On the following pages you will find suggestions for controlling them. Some of these suggestions are things which we can do for ourselves.

Some of the things can be done if everyone in the community helps.

This means that all of the
doctors,
engineers,
nurses,
teachers, and
EVERYBODY must help —

including YOU and YOU and YOU!

WHAT CAN BE DONE TO CONTROL MALARIA?

THESE ARE THE THINGS WHICH WE CAN DO FOR OURSELVES.

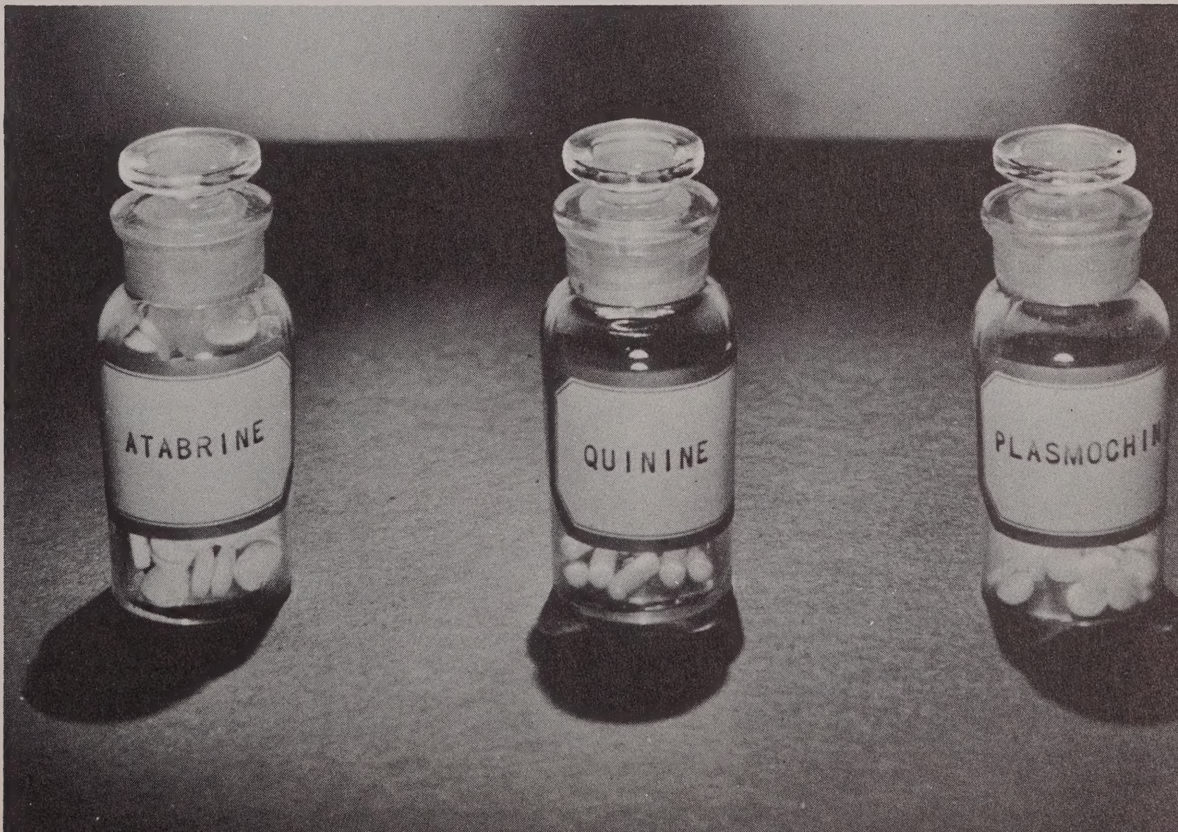
FIRST:

If we think that we have malaria, we can go to a doctor.

If the doctor finds that we have malaria, he gives us medicine. The medicine helps to make us well. We are less likely to have parasites which malaria mosquitoes can get and pass on to other persons.

We go to the doctor.

The doctor uses these.


ATABRINE
QUININE
PLASMOCHIN

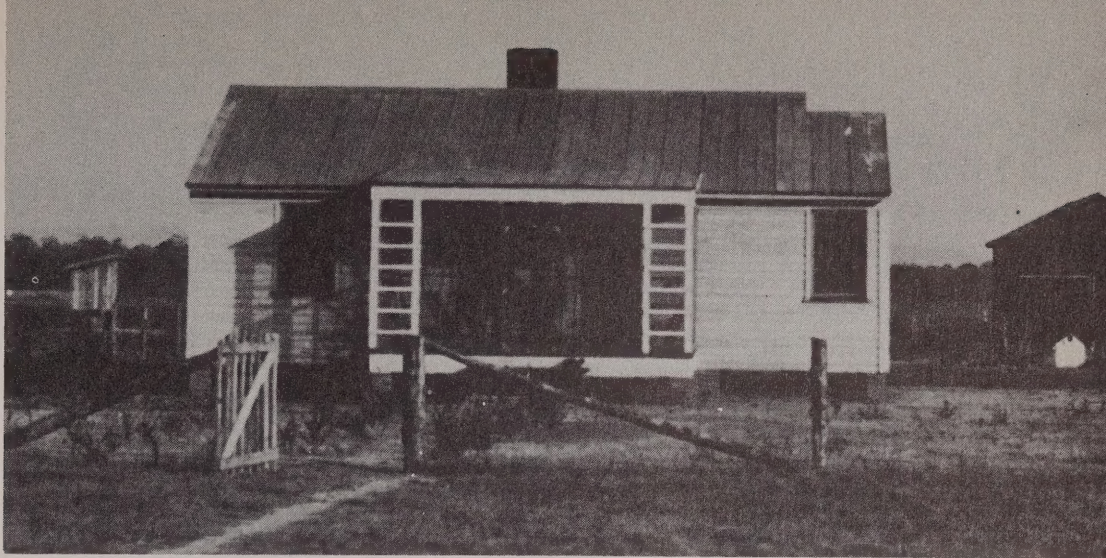
SECOND:

We can keep malaria mosquitoes out of our homes.

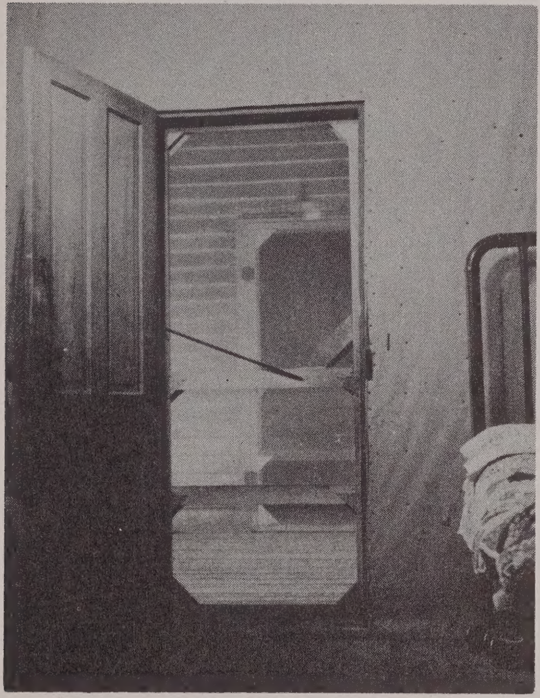
We do this by covering our doors and windows with screens. We also close cracks, chimneys, and other holes where they can get in. This is called mosquito-proofing. We mosquito-proof our homes, churches, and community meeting places.

Of course mosquito-proofing our homes does not help us unless we stay indoors at the times when malaria mosquitoes bite.

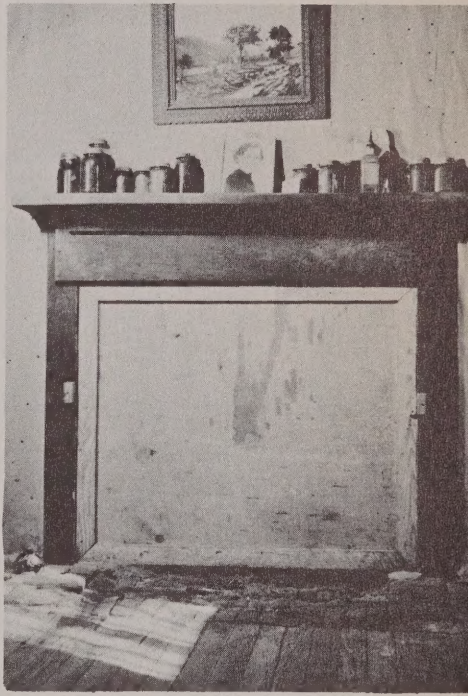
When we mosquito-proof, we . . . .



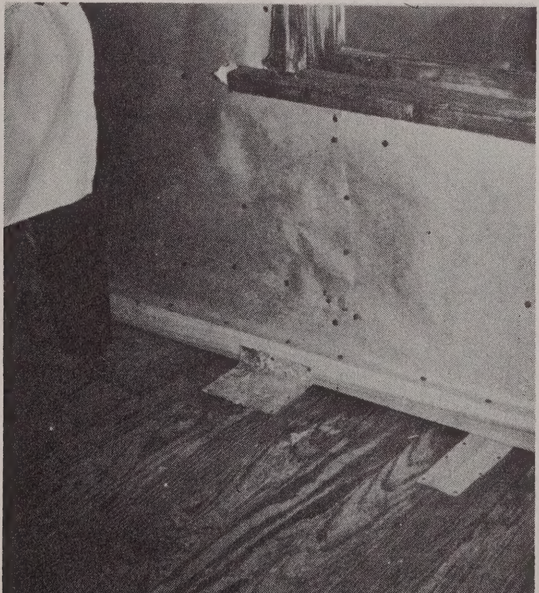
screen houses,



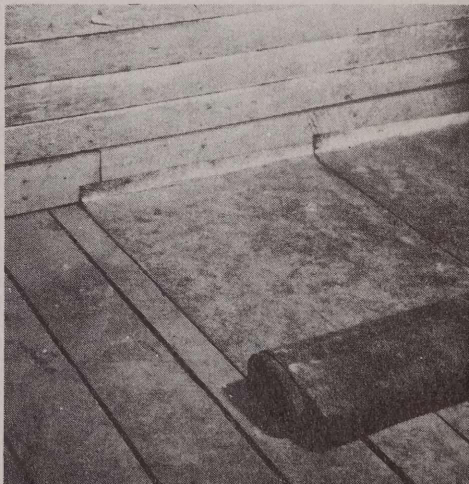
build strong screen doors,



seal fireplaces so mosquitoes that fly down chimney cannot get in,



cover wall cracks with heavy paper,



and cover floor cracks with roofing paper.

THIRD:

We find and kill mosquitoes which get into our houses.

"Quad" mosquitoes which are in houses are the ones that most often have malaria parasites in their bodies.

We should not let these mosquitoes live to bite us in our own homes.

We should not let these mosquitoes live to fly away and bite other people.

We find.

We kill.

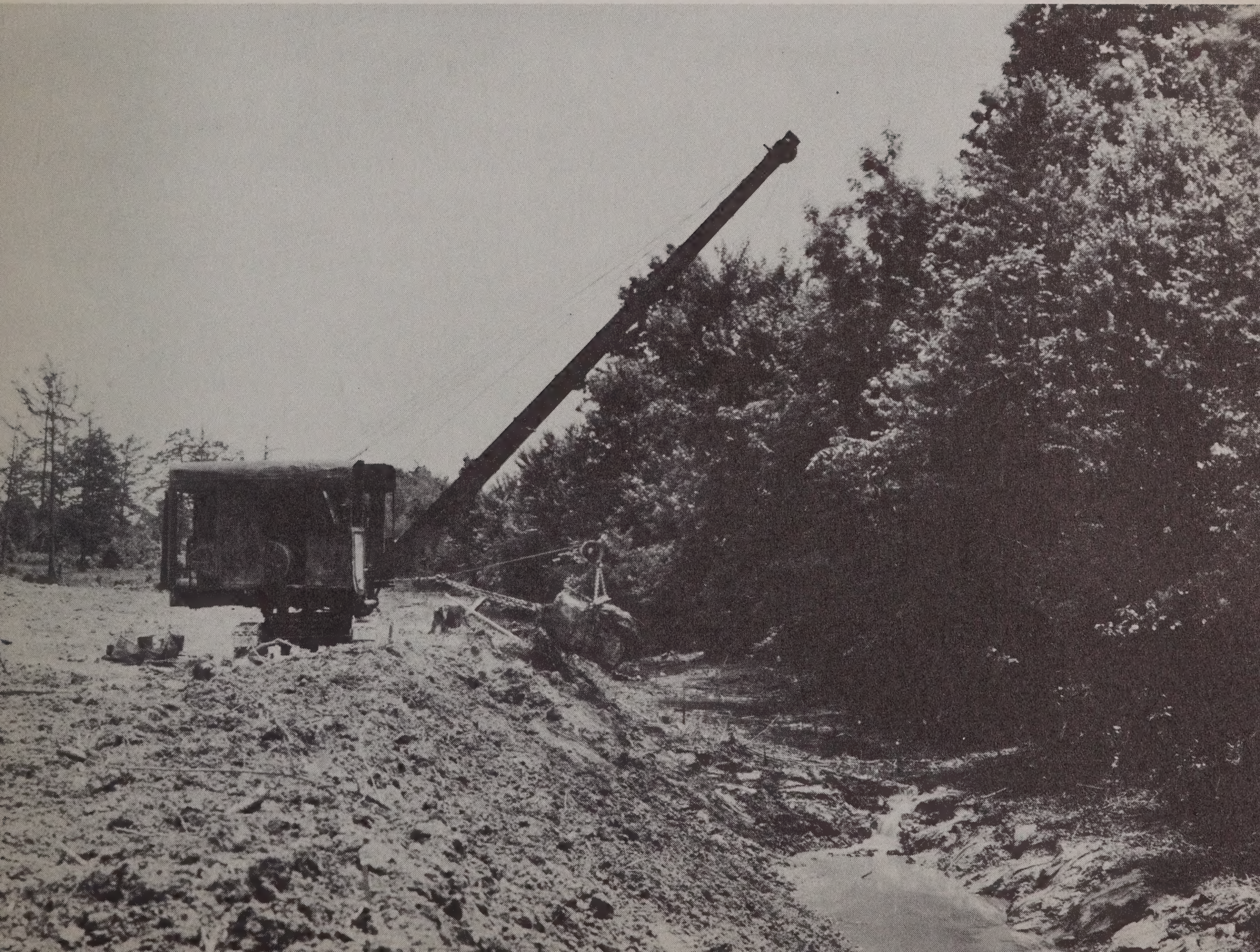
Often we can keep mosquitoes from becoming adults, and this is even better than trying to keep them away from us.

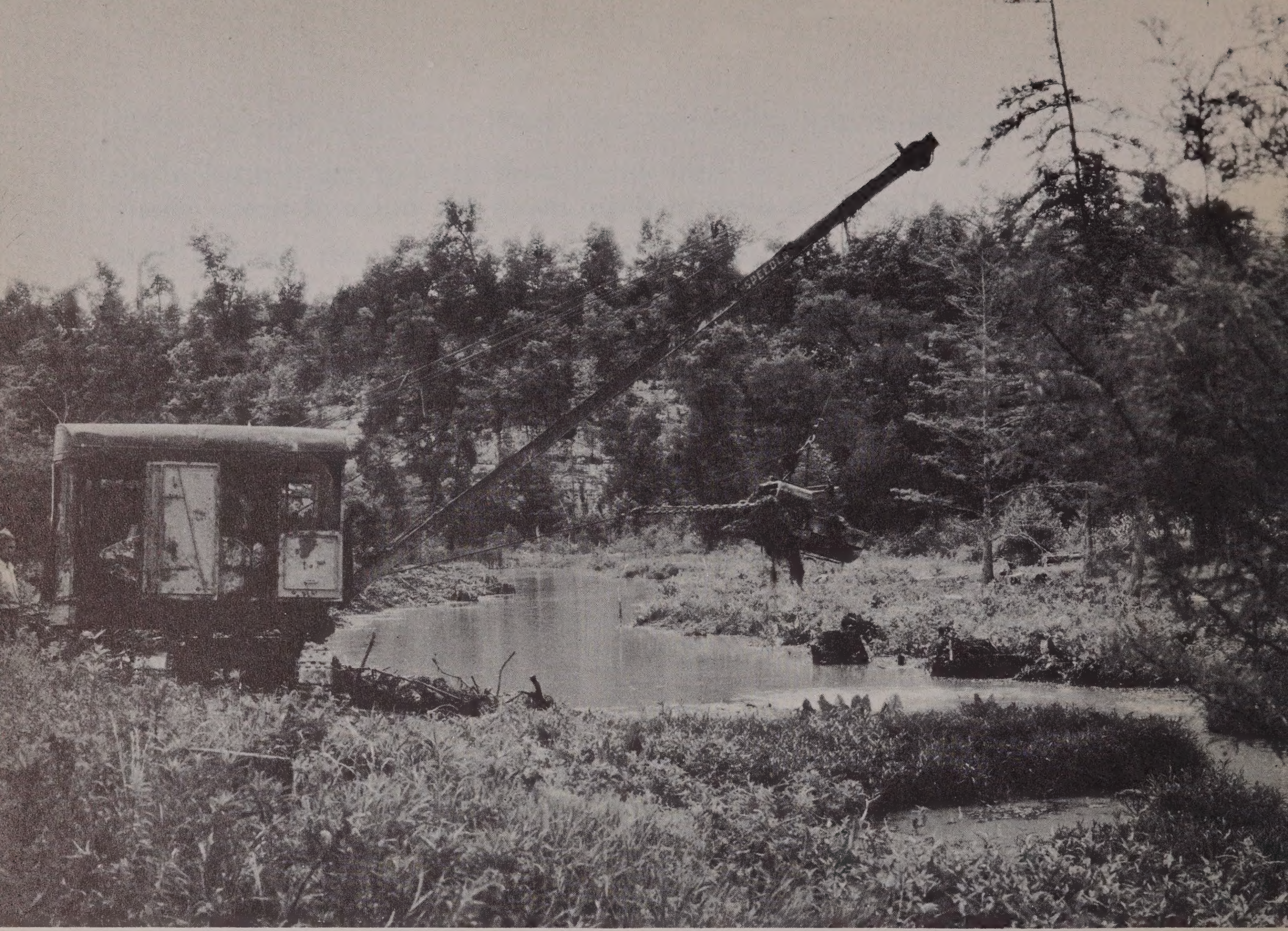
THESE ARE THE THINGS WHICH COMMUNITIES WORKING WITH TRAINED PERSONS CAN DO.

FIRST:

Persons who know how can show communities the best way to drain away water where "quad" eggs, larvae, and pupae could live and grow into adult mosquitoes.

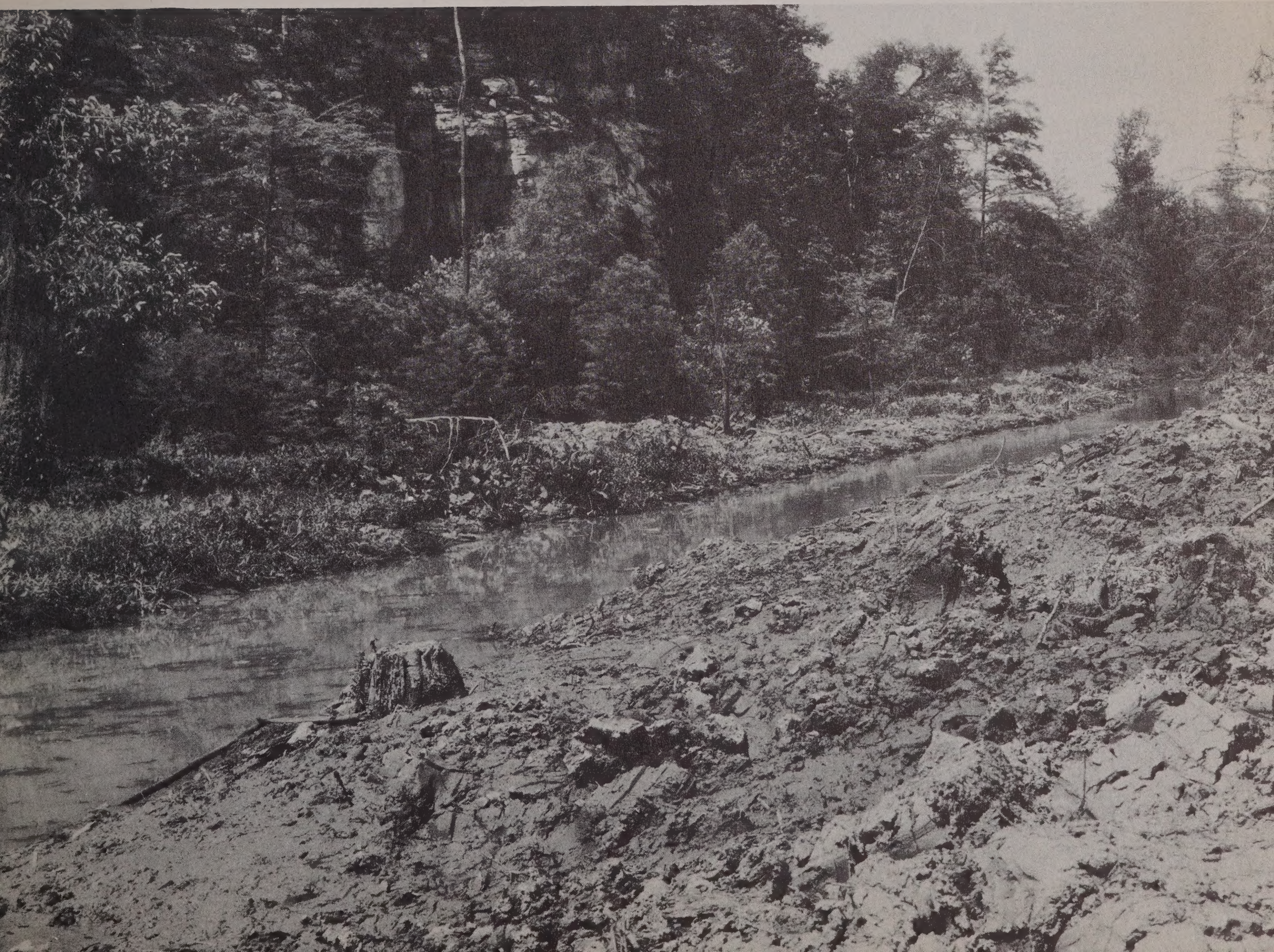
Digging a ditch to drain away the pools of water where malaria mosquitoes breed. See the water running from the small pools into the ditch.





Straightening and deepening an old creek so the water can no longer stand in pools.

The same old creek straightened and deepened. The malaria mosquitoes no longer breed here because the water is moving.



SECOND:

Ponds that are not easy to drain can be filled.

Sometimes communities fill such ponds with earth or with other material.

Filling a pond to remove a malaria mosquito-breeding place.

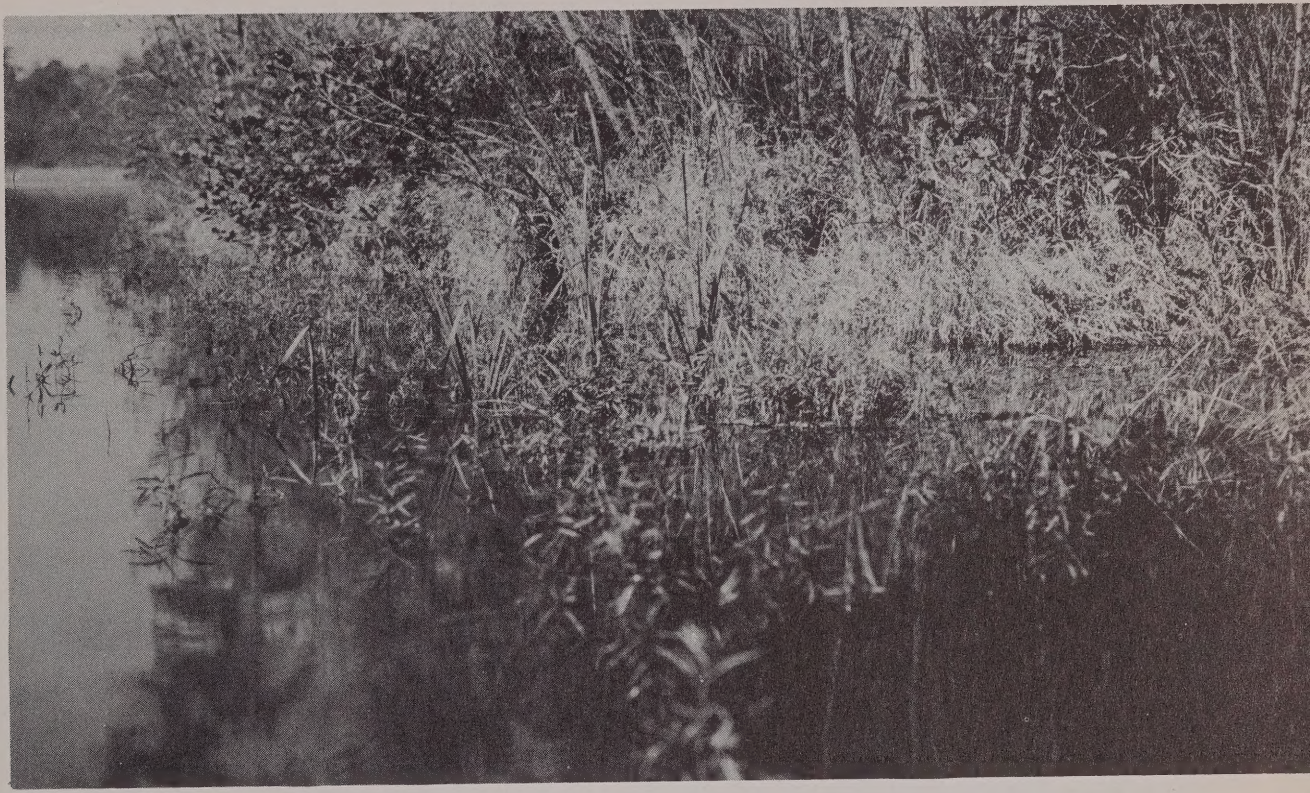
TUSCUMBIA
STREET DEPT

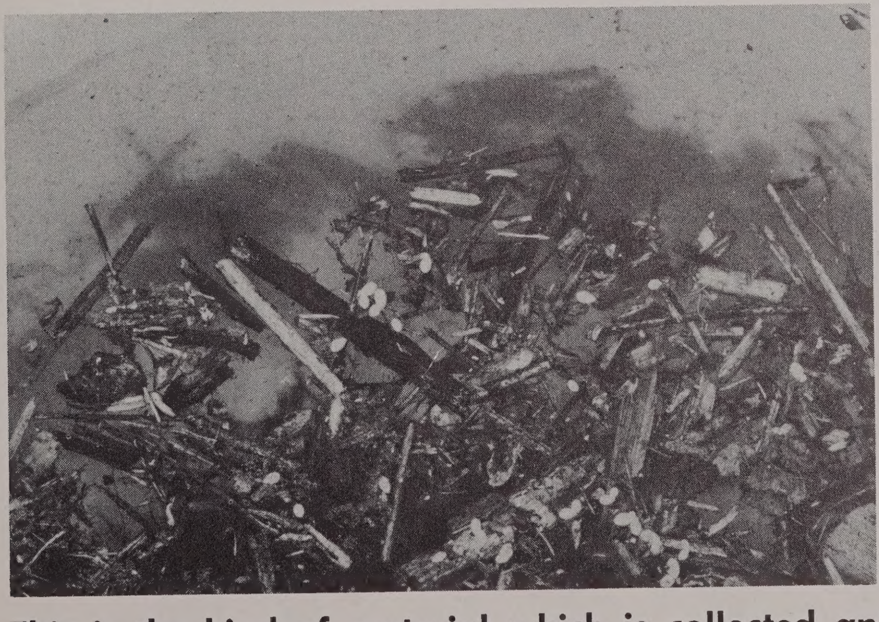
THIRD:

Persons who are trained can show communities how to clean the banks of ponds so there will be no protection for mosquito larvae.

Plants and trees growing in the water collect material in which mosquito larvae hide from their enemies. Plants and trees growing in the water should be removed.

Trees, bushes, and plants growing in the water. They collect material which protects the larvae and pupae of malaria mosquitoes.





This is the kind of material which is collected and held by the trees, bushes, and plants growing in the water.

FOURTH:

Persons who are trained can show communities how to keep water edges clean and make it easier for fish to find and eat mosquito eggs, larvae, and pupae.

Cutting plants to clear water edges.

A water edge which has been cleared.

FIFTH:

In lakes made by dams it is possible to raise and lower the water level. The dam is closed to raise the water. Then the dam is opened to lower the water. Floating material in which mosquitoes hide is left on the banks by lowering the water. Raising and lowering the water carries many larvae away from the safety of their warm, quiet pools. Then their enemies can find and eat them.

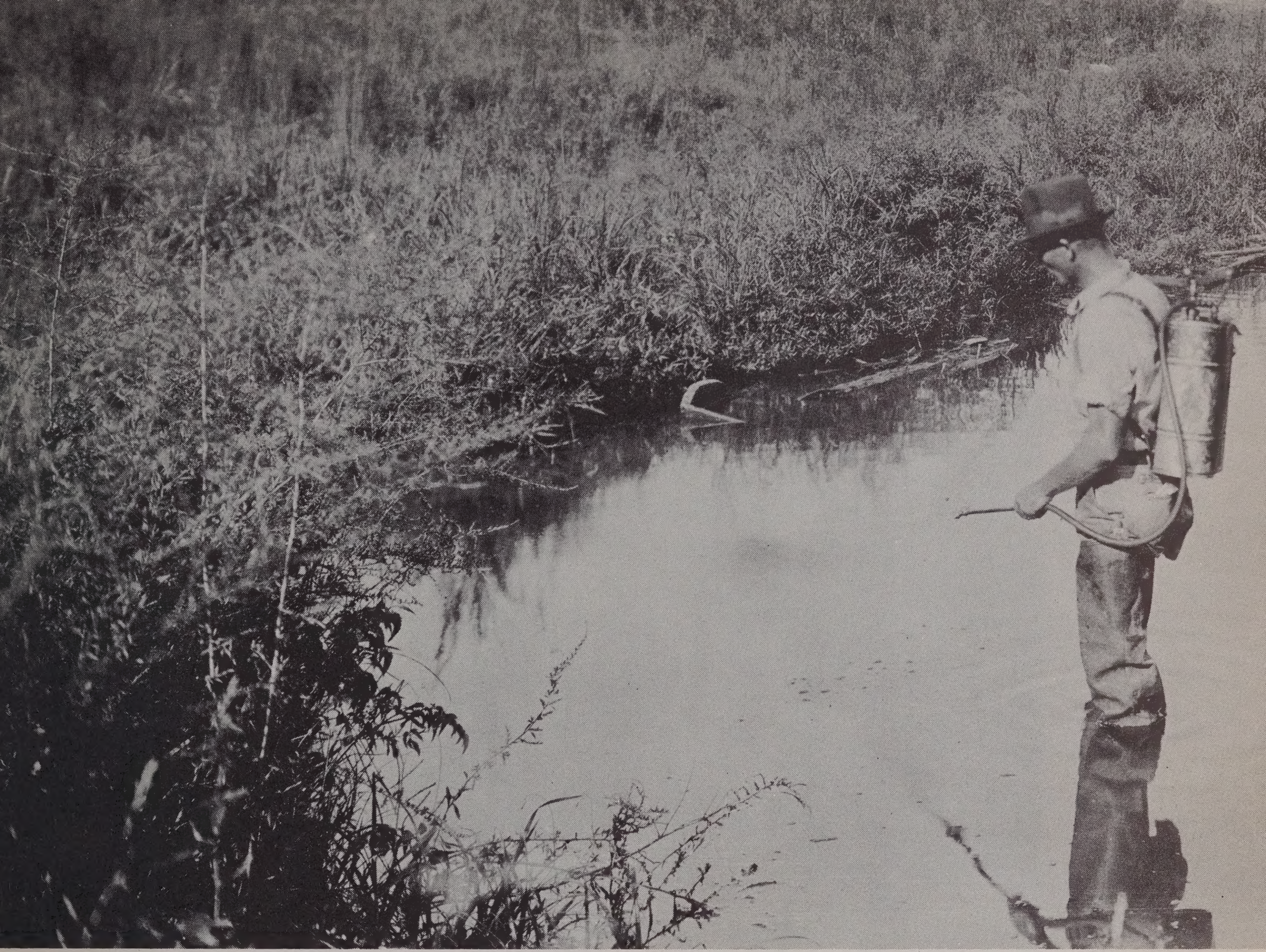
The water rises when the dam is closed.

The water lowers when the dam is opened.

Floating material is left on the banks.

SIXTH:

Persons who are trained know how to put a dust on the water to kill mosquito larvae. The larvae live at the top of the water. They eat the tiny grains of dust. The dust kills them.



SEVENTH:

Persons who are trained know how to use oil to kill mosquito larvae. A very thin layer of oil is put on the surface of the water. The oil kills the larvae.

WE KNOW THAT WITHOUT MALARIA WE ARE HEALTHIER, WEALTHIER PEOPLE. BECAUSE WE ARE HEALTHIER AND WEALTHIER, WE ARE HAPPIER.

WE HAVE SEEN HOW MALARIA CAN BE CONTROLLED.

Prepared by
The Staff of the Health and Safety Department
Tennessee Valley Authority